



601-1-131 PCT/US NATIONAL PHASE SEQUENCE LISTING REVISED SEP10.txt

SEQUENCE LISTING

<110> Inouye, Masayori
Zhang, Junjie
Zhang, Yong Long
Qing, Guoliang
Suzuki, Motoo

<120> mRNA Interferases and Methods of Use Thereof

<130> University of Medicine & Dentistry of New Jersey (601-1-131PCT)

<140> 10/560,303

<141> 2005-12-12

<150> PCT/US2004/018571

<151> 2004-06-14

<150> 60/543,693

<151> 2004-02-11

<150> 60/478,515

<151> 2003-06-13

<160> 120

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<211> 336

<212> DNA

<213> E. coli

<400> 1

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aacaaaacag	gtatgtgtct	gtgtgttctt	tgtacaacgc	aatcaaaagg	atatccgttc	180
gaagttgttt	tatccgggtca	ggaacgtgat	ggcgtagcgt	tagctgatca	ggtaaaaagt	240
atcgcttgcc	gggcaagagg	agcaacgaag	aaaggaacag	ttgccccaga	ggaattacaa	300
ctcattaag	cctaaaattaa	cgtactgatt	gggttag			336

<210> 2

<211> 111

<212> PRT

<213> E. coli

<400> 2

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Phe	Asp	Pro	Thr	Lys	Gly	Ser	Glu	Gln	Ala	Gly	His	Arg	Pro	Ala	Val	
			20					25					30			
Val	Leu	Ser	Pro	Phe	Met	Tyr	Asn	Lys	Thr	Gly	Met	Cys	Leu	Cys		
		35					40				45					
Val	Pro	Cys	Thr	Thr	Gln	Ser	Lys	Gly	Tyr	Pro	Phe	Glu	Val	Val	Leu	
	50				55					60						
Ser	Gly	Gln	Glu	Arg	Asp	Gly	Val	Ala	Leu	Ala	Asp	Gln	Val	Lys	Ser	
65				70				75					80			
Ile	Ala	Trp	Arg	Ala	Arg	Gly	Ala	Thr	Lys	Gly	Thr	Val	Ala	Pro		
			85				90					95				
Glu	Glu	Leu	Gln	Leu	Ile	Lys	Ala	Lys	Ile	Asn	Val	Leu	Ile	Gly		
		100					105					110				

<210> 3
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<400> 3
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 gttgttgtgc ccgtaaccag cggaggcaat ttgcccgcga ctgccggctt tgcggtgtcg 180
 ttggatgggtg ttggcatatc taccacaggt gttgtacgtt gcgatcaacc ccggacaatt 240
 gatatgaaag cacggggcgg aaaacgactc gaacgggttc cggagactat catgaacgaa 300
 gttcttggcc gcctgtccac tattctgact tga 333

<210> 4
 <211> 110
 <212> PRT
 <213> E. coli

<400> 4
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 His Glu Gln Gln Gly Thr Arg Pro Val Leu Ile Val Thr Pro Ala Ala
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 Phe Asn Arg Val Thr Arg Leu Pro Val Val Val Pro Val Thr Ser Gly
 35 40 45
 Gly Asn Phe Ala Arg Thr Ala Gly Phe Ala Val Ser Leu Asp Gly Val
 50 55 60
 Gly Ile Arg Thr Thr Gly Val Val Arg Cys Asp Gln Pro Arg Thr Ile
 65 70 75 80
 Asp Met Lys Ala Arg Gly Gly Lys Arg Leu Glu Arg Val Pro Glu Thr
 85 90 95
 Ile Met Asn Glu Val Leu Gly Arg Leu Ser Thr Ile Leu Thr
 100 105 110

<210> 5
 <211> 249
 <212> DNA
 <213> E. coli

<400> 5
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 ttaatgcagg cgctcaatct gaatatgat gatgaagtga agattgacct ggtggatggc 120
 aaattaatta ttgagccagt gcgtaaagag cccgtattta cgcttgctga actggtcaac 180
 gacatcacgc cggaacacct ccacgagaat atcgactggg gagagccgaa agataaggaa 240
 gtctggttaa 249

<210> 6
 <211> 82
 <212> PRT
 <213> E. coli

<400> 6
 Met Ile His Ser Ser Val Lys Arg Trp Gly Asn Ser Pro Ala Val Arg
 1 5 10 15

Ile Pro Ala Thr Leu Met Gln Ala Leu Asn Leu Asn Ile Asp Asp Glu
 20 25 30
 Val Lys Ile Asp Leu Val Asp Gly Lys Leu Ile Ile Glu Pro Val Arg
 35 40 45
 Lys Glu Pro Val Phe Thr Leu Ala Glu Leu Val Asn Asp Ile Thr Pro
 50 55 60
 Glu Asn Leu His Glu Asn Ile Asp Trp Gly Glu Pro Lys Asp Lys Glu
 65 70 75 80
 Val Trp

<210> 7
 <211> 258
 <212> DNA
 <213> E. coli

<400> 7
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 ctgctgaatg cgctgtctct gggcacagat aatgaagttg gcatgggtcat tgataatggc 120
 cggctgattg ttgagccgta cagacgcccg caatattcac tggctgagct actggcacag 180
 tgtgatccga atgctgaaat atcagctgaa gaacgagaat ggctggatgc accggcgact 240
 ggtcaggagg aaatctga 258

<210> 8
 <211> 85
 <212> PRT
 <213> E. coli

<400> 8
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 20 25 30
 Val Gly Met Val Ile Asp Asn Gly Arg Leu Ile Val Glu Pro Tyr Arg
 35 40 45
 Arg Pro Gln Tyr Ser Leu Ala Glu Leu Leu Ala Gln Cys Asp Pro Asn
 50 55 60
 Ala Glu Ile Ser Ala Glu Glu Arg Glu Trp Leu Asp Ala Pro Ala Thr
 65 70 75 80
 Gly Gln Glu Glu Ile
 85

<210> 9
 <211> 24
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> T54 to K77 fragment of E. coli Maze

<400> 9
 Thr Leu Ala Glu Leu Val Asn Asp Ile Thr Pro Glu Asn Leu His Glu
 1 5 10 15
 Asn Ile Asp Trp Gly Glu Pro Lys
 20

<210> 10
 <211> 18
 <212> PRT
 <213> Artificial Sequence

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<220>

<223> N60 to K77 fragment of E. coli Maze

<400> 10

Asn Asp Ile Thr Pro Glu Asn Leu His Glu Asn Ile Asp Trp Gly Glu
 1 5 10 15
 Pro Lys

<210> 11

<211> 30

<212> RNA

<213> Artificial sequence

<220>

<223> synthetic RNA substrate

<400> 11

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<210> 12

<211> 50

<212> DNA

<213> Artificial sequence

<220>

<223> single stranded oligonucleotide

<400> 12

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<210> 13

<211> 50

<212> DNA

<213> Artificial sequence

<220>

<223> single stranded oligonucleotide

<400> 13

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<210> 14

<211> 23

<212> DNA

<213> Artificial sequence

<220>

<223> synthetic oligonucleotide

<400> 14

agatctcgat cccgcaaatt aat 23

<210> 15

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> DNA primer

<400> 15

ttagagatca atttcctgcc gttttac

27

<210> 16

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> DNA primer

<400> 16

ttaaagatcg tcaacgtaac cg

22

<210> 17

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> DNA primer

<400> 17

tgctctttat cccacgggca gc

22

<210> 18

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> DNA primer

<400> 18

gcccagttca ccgcaagat cgtc

24

<210> 19

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> DNA primer

<400> 19

ggttttgatt tgctccaac gggcaag

27

<210> 20

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> DNA primer

<400> 20

catttcctcc tccagtttag cctggtc

27

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<210> 21
 <211> 27
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> DNA primer

 <400> 21
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 <210> 22
 <211> 24
 <212> DNA
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 <220>
 <223> DNA primer

 <400> 22
 gatccccaca atgcggtgac gagt 24

 <210> 23
 <211> 24
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> DNA primer

 <400> 23
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 <210> 24
 <211> 24
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> DNA primer

 <400> 24
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 <210> 25
 <211> 24
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> DNA primer

 <400> 25
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 <210> 26
 <211> 30
 <212> RNA
 <213> Artificial Sequence

 <220>
 <223> antisense RNA

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<400> 26
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<210> 27
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> complementary DNA

<400> 27
gatttgattc atatgtatat ctccttctta 30

<210> 28
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA primer

<400> 28
agaatgtgcg ccatttttca ct 22

<210> 29
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA fragment from pCold I vector

<400> 29
taatacacc 9

<210> 30
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 30
atgaatcaca aagtg 15

<210> 31
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA fragment from pCold I vector

<400> 31
catcatcatc atcatcat 18

<210> 32
<211> 12
<212> DNA
<213> Artificial Sequence

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<220>
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<400> 32
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<210> 33
 <211> 60
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> multiple cloning site

<400> 33
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<210> 34
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> DNA primer

<400> 34
 caggagauac cucaaugauc a 21

<210> 35
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> DNA primer

<400> 35
 ctcaatgatc acaggagata c 21

<210> 36
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> DNA primer

<400> 36
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<210> 37
 <211> 16
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> DNA primer

<400> 37
 gggacaggag atacct 16

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<210> 38
 <211> 23
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> DNA primer

<400> 38
 tgtcctctat ggagttacta gtg 23

<210> 39
 <211> 330
 <212> DNA
 <213> *Bacillus halodurans*

<400> 39
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 gaccaagccg ggacacgacc ggctattggt ttgtcccta aattatttaa taaaaacaca 120
 ggttttgcgg tggtttggtc aattaccaga caacaaaaag gttatccttt tgaaatagaa 180
 ataccaccgg ggttacctat tgaaggggtt attcttactg accaagtaaa aagtctggat 240
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 ttacaactta ttcatacatt tttatcttaa 330

<210> 40
 <211> 363
 <212> DNA
 <213> *Staphylococcus epidermidis*

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 gtaattgtag ctgcgattac tgatgggatt aataaagcga aaataccaac ccacgtagaa 180
 attgaaaaga aaaagtataa attagacaaa gattcagtta ttcttcttga acaaattaga 240
 acactagata aaaagcggtt aaaagaaaaa ttaacatttt tatcagagag taaaatgata 300
 gaggttgata atgccttaga tattagtttg ggattaaata actttgatca tcataaatct 360
 taa 363

<210> 41
 <211> 411
 <212> DNA
 <213> *Staphylococcus aureus*

<400> 41
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 gggggagtca gacctgtagt cataattcaa aatgatactg gtaataaata tagtcctaca 120
 gttattgttg cggcaataac tggtaggatt aataaagcga aaataccgac acatgtagag 180
 attgaaaaga aaaagtataa gttggataaa gactcagtta tattattaga acaaattcgt 240
 acacttgata aaaaacgatt gaaagaaaaa ctgacgtact tatccgatga taaaatgaaa 300
 gaagtagata atgcactaat gattagttta gggctgaatg cagtagctca accagaaaaa 360
 ttaggcgtct atttatgtga ttttcagag ataaataaaa tattgatata a 411

<210> 42
 <211> 351
 <212> DNA
 <213> *Bacillus subtilis*

<400> 42
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 caaggcgggg tgcgcccggg tttagtgtat caaaatgaca tcggaaatcg cttcagccca 120
 actgctattg ttgcagccat aacagcacia atacagaaag cgaaattacc aaccacgctc 180
 gaaatcgatg caaaacgcta cggttttgaa agagattccg ttattttgct ggagcaaatt 240

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cggacgattg acaagcaaag gttaacggat aagattactc atctggatga tgaaatgatg 300
 gataaggttg atgaagcctt acaaatacgt ttggcactca ttgattttta g 351

<210> 43

<211> 324

<212> DNA

<213> Neisseria meningitides

<400> 43

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 gaaatcaaaa agacacgtcc ttgtgtcgtg gtctctcctc ctgaaatata caactatctc 120
 aagactgtgc tgatcggtcc catgacgagc ggaagccgtc ctgcccgtt ccgctgaat 180
 gtccgctttc aggataaaga cggtttgctt ttgcccgaac agattagggc tgtggataaa 240
 gccggttggt tcaaacaatc ttggcaattta gacaacagta cggctgaaaa actgtttgca 300
 gtattgcagg agatgtttgc ctga 324

<210> 44

<211> 366

<212> DNA

<213> Morganella morganii

<400> 44

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 tcgcttgacc ctaccgcagg tcatgagcag cagggaaacgc ggccggtact gattgtcacg 120
 ccggtgtgct ttaaccgcgt gaccgcgctg cctgtttgtt tgcccgtgac cagcggaggt 180
 aattttgccc gcacagcagg ctttgtctgt tcgcttgacg gcgcccggcat acgtaccacc 240
 ggcgtttgtc gttgcgatca accccggacg atcgatatga aagcccgcgg cggcaaacga 300
 ctcgaacggg tgccagagac tatcatggac gacgttcttg gccgtctggc caccatcctg 360
 acctga 366

<210> 45

<211> 321

<212> DNA

<213> Mycobacterium tuberculosis

<400> 45

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 caacgcgggc ggcgctacgc cgtggtcatc agccccggct cgatgccgtg gagtgtagta 120
 accgtggtgc cgacgtcgac aagcgcccaa cctgcgggtt tccgaccaga gctggaagtc 180
 atgggaacaa agacacggtt cctggtggat cagatccgga cgatcggcat cgtctatgtg 240
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 gcacgatacc ttggtctgtg a 321

<210> 46

<211> 109

<212> PRT

<213> Bacillus halodurans

<400> 46

Met Pro Val Pro Asp Arg Gly Asn Leu Val Tyr Val Asp Phe Asn Pro
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 20 25 30
 Pro Lys Leu Phe Asn Lys Asn Thr Gly Phe Ala Val Val Cys Pro Ile
 35 40 45
 Thr Arg Gln Gln Lys Gly Tyr Pro Phe Glu Ile Glu Ile Pro Pro Gly
 50 55 60
 Leu Pro Ile Glu Gly Val Ile Leu Thr Asp Gln Val Lys Ser Leu Asp
 65 70 75 80
 Trp Arg Ala Arg Asn Phe His Ile Lys Gly Gln Ala Pro Glu Glu Thr
 85 90 95
 Val Thr Asp Cys Leu Gln Leu Ile His Thr Phe Leu Ser
 100 105

<210> 47
 <211> 120
 <212> PRT
 <213> Staphylococcus epidermidis

<400> 47
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 Gly Ser Glu Gln Gly Gly Val Arg Pro Val Val Ile Ile Gln Asn Asp
 20 25 30
 Thr Gly Asn Lys Tyr Ser Pro Thr Val Ile Val Ala Ala Ile Thr Asp
 35 40 45
 Gly Ile Asn Lys Ala Lys Ile Pro Thr His Val Glu Ile Glu Lys Lys
 50 55 60
 Lys Tyr Lys Leu Asp Lys Asp Ser Val Ile Leu Leu Glu Gln Ile Arg
 65 70 75 80
 Thr Leu Asp Lys Lys Arg Leu Lys Glu Lys Leu Thr Phe Leu Ser Glu
 85 90 95
 Ser Lys Met Ile Glu Val Asp Asn Ala Leu Asp Ile Ser Leu Gly Leu
 100 105 110
 Asn Asn Phe Asp His His Lys Ser
 115 120

<210> 48
 <211> 136
 <212> PRT
 <213> Staphylococcus aureus

<400> 48
 Met Ile Arg Arg Gly Asp Val Tyr Leu Ala Asp Leu Ser Pro Val Gln
 1 5 10 15
 Gly Ser Glu Gln Gly Gly Val Arg Pro Val Val Ile Ile Gln Asn Asp
 20 25 30
 Thr Gly Asn Lys Tyr Ser Pro Thr Val Ile Val Ala Ala Ile Thr Gly
 35 40 45
 Arg Ile Asn Lys Ala Lys Ile Pro Thr His Val Glu Ile Glu Lys Lys
 50 55 60
 Lys Tyr Lys Leu Asp Lys Asp Ser Val Ile Leu Leu Glu Gln Ile Arg
 65 70 75 80
 Thr Leu Asp Lys Lys Arg Leu Lys Glu Lys Leu Thr Tyr Leu Ser Asp
 85 90 95
 Asp Lys Met Lys Glu Val Asp Asn Ala Leu Met Ile Ser Leu Gly Leu
 100 105 110
 Asn Ala Val Ala Gln Pro Glu Lys Leu Gly Val Tyr Tyr Met Tyr Phe
 115 120 125
 Ser Glu Ile Asn Lys Ile Leu Ile
 130 135

<210> 49
 <211> 116
 <212> PRT
 <213> Bacillus subtilis

<400> 49
 Met Ile Val Lys Arg Gly Asp Val Tyr Phe Ala Asp Leu Ser Pro Val
 1 5 10 15
 Val Gly Ser Glu Gln Gly Gly Val Arg Pro Val Leu Val Ile Gln Asn
 20 25 30
 Asp Ile Gly Asn Arg Phe Ser Pro Thr Ala Ile Val Ala Ala Ile Thr
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Ala Gln Ile Gln Lys Ala Lys Leu Pro Thr His Val Glu Ile Asp Ala
      50      55      60
Lys Arg Tyr Gly Phe Glu Arg Asp Ser Val Ile Leu Leu Glu Gln Ile
      65      70      75      80
Arg Thr Ile Asp Lys Gln Arg Leu Thr Asp Lys Ile Thr His Leu Asp
      85      90      95
Asp Glu Met Met Asp Lys Val Asp Glu Ala Leu Gln Ile Ser Leu Ala
      100      105      110
Leu Ile Asp Phe
      115

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<210> 50
 <211> 115
 <212> PRT
 <213> Neisseria meningitides

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<400> 50
Met Tyr Ile Pro Asp Lys Gly Asp Ile Phe His Leu Asn Phe Asp Pro
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Ser Ser Gly Lys Glu Ile Lys Gly Gly Arg Phe Ala Leu Ala Leu Ser
      20      25      30
Pro Lys Ala Phe Asn Arg Ala Thr Gly Leu Val Phe Ala Cys Pro Ile
      35      40      45
Ser Gln Gly Asn Ala Ala Ala Ala Arg Ser Ser Gly Met Ile Ser Thr
      50      55      60
Leu Leu Gly Ala Gly Thr Glu Thr Gln Gly Asn Val His Cys His Gln
      65      70      75      80
Leu Lys Ser Leu Asp Trp Gln Ile Arg Lys Ala Ser Phe Lys Glu Thr
      85      90      95
Val Pro Asp Tyr Val Leu Asp Asp Val Leu Ala Arg Ile Gly Ala Val
      100      105      110
Leu Phe Asp
      115

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<210> 51
 <211> 121
 <212> PRT
 <213> Morganella morgani

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<400> 51
Met Arg Arg Arg Leu Val Arg Arg Lys Ser Asp Met Glu Arg Gly Glu
  1      5      10      15
Ile Trp Leu Val Ser Leu Asp Pro Thr Ala Gly His Glu Gln Gln Gly
      20      25      30
Thr Arg Pro Val Leu Ile Val Thr Pro Ala Ala Phe Asn Arg Val Thr
      35      40      45
Arg Leu Pro Val Val Val Pro Val Thr Ser Gly Gly Asn Phe Ala Arg
      50      55      60
Thr Ala Gly Phe Ala Val Ser Leu Asp Gly Ala Gly Ile Arg Thr Thr
      65      70      75      80
Gly Val Val Arg Cys Asp Gln Pro Arg Thr Ile Asp Met Lys Ala Arg
      85      90      95
Gly Gly Lys Arg Leu Glu Arg Val Pro Glu Thr Ile Met Asp Asp Val
      100      105      110

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Leu Gly Arg Leu Ala Thr Ile Leu Thr
115 120

<210> 52
<211> 118
<212> PRT
<213> Mycobacterium tuberculosis

<400> 52
Met Met Arg Arg Gly Glu Ile Trp Gln Val Asp Leu Asp Pro Ala Arg
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20 25 30
Arg Ala Asn Ala Thr Ala Thr Arg Leu Gly Arg Gly Val Ile Thr Val
35 40 45
Val Pro Val Thr Ser Asn Ile Ala Lys Val Tyr Pro Phe Gln Val Leu
50 55 60
Leu Ser Ala Thr Thr Thr Gly Leu Gln Val Asp Cys Lys Ala Gln Ala
65 70 75 80
Glu Gln Ile Arg Ser Ile Ala Thr Glu Arg Leu Leu Arg Pro Ile Gly
85 90 95
Arg Val Ser Ala Ala Glu Leu Ala Gln Leu Asp Glu Ala Leu Lys Leu
100 105 110
His Leu Asp Leu Trp Ser
115

<210> 53
<211> 243
<212> DNA
<213> Deinococcus radiodurans

<400> 53
atgacgagtc aaattcagaa atggggcaac agcctcgcgc tccgcattcc caaagctctg 60
gcgcagcagg tgggactgac gcagagttca gaagtggagc tgcttcttca ggacggtcag 120
attgtcatcc ggccagttcc tgctcggcag tacgatctcg ccgcgctgct ggccgaaatg 180
acacctgaaa atctgcatgg ggaaacagac tggggcgcac tggaaggacg cgaggaatgg 240
taa 243

<210> 54
<211> 246
<212> DNA
<213> Bacillus halodurans

<400> 54
gtgacactca tgactactat acaaaagtgg ggaaatagtt tagctgttcg tattccgaac 60
cattatgcta aacatattaa cgttacgcaa ggatctgaaa ttgaactaag cttagggagt 120
gatcaaacga ttatttttaa gcctaaaaaa agaaagccaa cattagagga attagtggca 180
aaaatcactc ctgaaaacag acataacgaa attgatttcg ggagaacagg aaaggaattg 240
ttgtaa 246

<210> 55
<211> 258
<212> DNA
<213> E. coli Plasmid R100

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<400> 55
atgcataacca cccgactgaa gaggggttggc ggctcagtta tgctgaccgt cccaccggca 60
ctgctgaatg cgctgtctct gggcacagat aatgaagttg gcatgggtcat tgataatggc 120
cggctgattg ttgagccgta cagacgcccg caatattcac tggctgagct actggcacag 180
tgtgatccga atgctgaaat atcagctgaa gaacgagaat ggctggatgc accggcgact 240
ggtcaggagg aaatctga 258

<210> 56
<211> 294
<212> DNA
<213> E. coli Plasmid R466b

<400> 56
atgttatatt taaatataac ttttatggag ggaaaaatgc ataccactcg actgaagaag 60
gttgccggct cagtcattgct gaccgtccca ccggcactgc tgaatgcgct gtcgctgggt 120
acagataatg aagttggcat ggctattgat aatggccggc tgattgtgga gccgcacaga 180
cgcccgcagt attcactggc tgagctgttg gcacagtgcg atccgaacgc tgaaatctcg 240
gcagaagaac gtgaatggct ggatgacgag cgggctggtc aggaggaaat ctga 258

<210> 57
<211> 258
<212> DNA
<213> Escherichia coli

<400> 57
gtgcagatgc gtattaccat aaaaagatgg gggaacagtg cagggtatggt cattcccaat 60
atcgtaatga aagaacttaa cttacagccg gggcagagcg tgaagtgcg ggtgagcaac 120
aaccaactga ttctgacacc catctccagg cgctactcgc ttgatgaact gctggcacag 180
tgtgacatga acgccgcgga acttagcgag caggatgtct ggggtaaatc caccctgcg 240
ggtgacgaaa tatggtaa 258

<210> 58
<211> 255
<212> DNA
<213> Pseudomonas putida

<400> 58
atgcagatca agattcaaca gtggggcaac agcgcgcgca tccgcttgcc cgccgcagta 60
ctcaagcaga tgcgcctcgg tgctcggtcc accctgagcc ttgacacaac ggggtgagacg 120
atggtgctca aaccgcgtcag gtcgaaaccc aagtacaccc ttgaggaact gatggcccag 180
tgtgacctga gtgcaccgga gccagaggac atggccgact ggaatgcat gcgcccagtg 240
gggcgtgaag tgtga 255

<210> 59
<211> 260
<212> DNA
<213> Photobacterium profundum

<400> 59
gtgcaatgag aactcagata agaaagatcg gtaactcact tggttcaatt attcctgccca 60
cttttattcg tcagcttgaa ctggcagagg gcgcagaaat tgatgttaaa acggttgatg 120
gaaaaattgt gattgagcca attagaaaaa tgaaaaaacg tttccattc agtgagcgtg 180
aattactaag tggattggat gcacacactg ctcattgctga cgaactgggt gtaatttcta 240
cccaggagct aggcgaataa 260

<210> 60
<211> 80

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<212> PRT

<213> *Deinococcus radiodurans*

<400> 60

```

Met Thr Ser Gln Ile Gln Lys Trp Gly Asn Ser Leu Ala Leu Arg Ile
 1          5          10          15
Pro Lys Ala Leu Ala Gln Gln Val Gly Leu Thr Gln Ser Ser Glu Val
          20          25          30
Glu Leu Leu Leu Gln Asp Gly Gln Ile Val Ile Arg Pro Val Pro Ala
          35          40          45
Arg Gln Tyr Asp Leu Ala Ala Leu Leu Ala Glu Met Thr Pro Glu Asn
          50          55          60
Leu His Gly Glu Thr Asp Trp Gly Ala Leu Glu Gly Arg Glu Glu Trp
65          70          75          80

```

<210> 61

<211> 81

<212> PRT

<213> *Bacillus halodurans*

<400> 61

```

Met Thr Leu Met Thr Thr Ile Gln Lys Trp Gly Asn Ser Leu Ala Val
 1          5          10          15
Arg Ile Pro Asn His Tyr Ala Lys His Ile Asn Val Thr Gln Gly Ser
          20          25          30
Glu Ile Glu Leu Ser Leu Gly Ser Asp Gln Thr Ile Ile Leu Lys Pro
          35          40          45
Lys Lys Arg Lys Pro Thr Leu Glu Glu Leu Val Ala Lys Ile Thr Pro
          50          55          60
Glu Asn Arg His Asn Glu Ile Asp Phe Gly Arg Thr Gly Lys Glu Leu
65          70          75          80
Leu

```

<210> 62

<211> 85

<212> PRT

<213> *E. coli* PemI plasmid R100

<400> 62

```

Met His Thr Thr Arg Leu Lys Arg Val Gly Gly Ser Val Met Leu Thr
 1          5          10          15
Val Pro Pro Ala Leu Leu Asn Ala Leu Ser Leu Gly Thr Asp Asn Glu
          20          25          30
Val Gly Met Val Ile Asp Asn Gly Arg Leu Ile Val Glu Pro Tyr Arg
          35          40          45
Arg Pro Gln Tyr Ser Leu Ala Glu Leu Leu Ala Gln Cys Asp Pro Asn
          50          55          60
Ala Glu Ile Ser Ala Glu Glu Arg Glu Trp Leu Asp Ala Pro Ala Thr
65          70          75          80

```

```

Gly Gln Glu Glu Ile
          85

```

<210> 63

<211> 97

<212> PRT

<213> *E. coli* PemI plasmid R466b

<400> 63

```

Met Leu Tyr Leu Asn Ile Thr Phe Met Glu Gly Lys Met His Thr Thr

```

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```

1           5           10           15
Arg Leu Lys Lys Val Gly Gly Ser Val Met Leu Thr Val Pro Pro Ala
                20           25           30
Leu Leu Asn Ala Leu Ser Leu Gly Thr Asp Asn Glu Val Gly Met Val
                35           40           45
Ile Asp Asn Gly Arg Leu Ile Val Glu Pro His Arg Arg Pro Gln Tyr
                50           55           60
Ser Leu Ala Glu Leu Leu Ala Gln Cys Asp Pro Asn Ala Glu Ile Ser
65           70           75           80
Ala Glu Glu Arg Glu Trp Leu Asp Ala Pro Ala Ala Gly Gln Glu Glu
                85           90           95
Ile

```

<210> 64
 <211> 85
 <212> PRT
 <213> Escherichia coli

```

<400> 64
Met Gln Met Arg Ile Thr Ile Lys Arg Trp Gly Asn Ser Ala Gly Met
1           5           10           15
Val Ile Pro Asn Ile Val Met Lys Glu Leu Asn Leu Gln Pro Gly Gln
                20           25           30
Ser Val Glu Ala Gln Val Ser Asn Gln Leu Ile Leu Thr Pro Ile
                35           40           45
Ser Arg Arg Tyr Ser Leu Asp Glu Leu Leu Ala Gln Cys Asp Met Asn
50           55           60
Ala Ala Glu Leu Ser Glu Gln Asp Val Trp Gly Lys Ser Thr Pro Ala
65           70           75           80
Gly Asp Glu Ile Trp
                85

```

<210> 65
 <211> 84
 <212> PRT
 <213> Pseudomonas putida

```

<400> 65
Met Gln Ile Lys Ile Gln Gln Trp Gly Asn Ser Ala Ala Ile Arg Leu
1           5           10           15
Pro Ala Ala Val Leu Lys Gln Met Arg Leu Gly Val Gly Ser Thr Leu
                20           25           30
Ser Leu Asp Thr Thr Gly Glu Thr Met Val Leu Lys Pro Val Arg Ser
                35           40           45
Lys Pro Lys Tyr Thr Leu Glu Glu Leu Met Ala Gln Cys Asp Leu Ser
50           55           60
Ala Pro Glu Pro Glu Asp Met Ala Asp Trp Asn Ala Met Arg Pro Val
65           70           75           80
Gly Arg Glu Val

```

<210> 66
 <211> 85
 <212> PRT
 <213> Photobacterium profundum

```

<400> 66
Ala Met Arg Thr Gln Ile Arg Lys Ile Gly Asn Ser Leu Gly Ser Ile
1           5           10           15

```


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Ile Pro Ala Thr Phe Ile Arg Gln Leu Glu Leu Ala Glu Gly Ala Glu
 20 25 30
 Ile Asp Val Lys Thr Val Asp Gly Lys Ile Val Ile Glu Pro Ile Arg
 35 40 45
 Lys Met Lys Lys Arg Phe Pro Phe Ser Glu Arg Glu Leu Leu Ser Gly
 50 55 60
 Leu Asp Ala His Thr Ala His Ala Asp Glu Leu Val Val Ile Ser Thr
 65 70 75 80
 Gln Glu Leu Gly Glu
 85

<210> 67
 <211> 228
 <212> DNA
 <213> Homo sapiens

<400> 67
 atgggtccag catctgttcc gactacctgt tgctttaacc tggcgaaccg caaaattccg 60
 ctgcagcgcc tggaaagcta tcgccgtatt acctctggca aatgcccgcg gaaagcggtg 120
 atctttaaaa ccaaactggc gaaagatatt tgcgcggatc cgaaaaaaaa atgggtgcag 180
 gattctatga aatatctgga tcagaaatct ccgaccccca aaccgtaa 228

<210> 68
 <211> 73
 <212> PRT
 <213> Homo sapiens

<400> 68
 Gly Pro Ala Ser Pro Thr Thr Cys Cys Phe Asn Leu Ala Asn Arg Lys
 1 5 10 15
 Ile Pro Leu Gln Arg Leu Glu Ser Tyr Arg Arg Ile Thr Ser Gly Lys
 20 25 30
 Cys Pro Gln Lys Ala Val Ile Phe Lys Thr Lys Leu Ala Lys Asp Ile
 35 40 45
 Cys Ala Asp Pro Lys Lys Lys Trp Val Gln Asp Ser Met Lys Tyr Leu
 50 55 60
 Asp Gln Lys Ser Pro Thr Pro Lys Pro
 65 70

<210> 69
 <211> 357
 <212> DNA
 <213> Mycobacterium tuberculosis

<400> 69
 gtgatgcgcc gcggtgagat ttggcaggtc gatctcgacc ccgctcgagg tagcgaagcg 60
 aacaaccagc gccccgccgt cgctcgtcagc aacgaccggg ccaacgcgac cgccacgcgt 120
 ctggggcgcg gcgtcatcac cgctcgtgcc gtgacgagca acatcgccaa ggtctatccg 180
 ttccaggtgt tgttgctcggc caccactact ggtctccagg tcgactgcaa ggcgcaggcc 240
 gagcaaatca gatcgattgc taccgagcgg ttgctccggc caatcggccg agtttcagcc 300
 gccgaacttg cccagctcga tgaggctttg aaactgcata tcgacttatg gtcgtag 357

<210> 70
 <211> 282
 <212> DNA
 <213> Mycobacterium tuberculosis

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<400> 70

```

atgctgcgcg gtagatctg gcaggtcgac ctggatccgg cccgcggcag cgcggcaaat 60
atgcggcggc cagcggtaat tgtcagcaac gacagggcca acgctgccgc gatacgtctc 120
gaccgaggcg tgggtgccgg tgtcccgggt accagcaaca ccgaaaagggt ccccatcca 180
ggtgttgttg ccggcagcga gcggtggcct ggccgtcgat tcgaaggcgc aggccagca 240
ggttgatcc gtcgctgcgc aacgtctccc ctgccgagct ga 282

```

<210> 71

<211> 345

<212> DNA

<213> Mycobacterium tuberculosis

<400> 71

```

gtggtgatta gtcgtgccga gatctactgg gctgacctcg ggccgccatc aggcagtcag 60
ccggcgaagc gccgcccggg gctcgtaatc cagtcagatc cgtacaacgc aagtcgcctt 120
gccactgtga tcgcagcggg gatcacgtcc aatacggcgc tggcggcaat gcccggaac 180
gtgttcttgc ccgcgaccac aacgcgactg ccacgtgact cggtcgtcaa cgtcacggcg 240
attgtcacgc tcaacaagac tgacctcacc gaccgagttg gggaggtgcc agcgagcttg 300
atgcacgagg ttgaccgagg acttcgtcgc gtactggacc ttgga 345

```

<210> 72

<211> 309

<212> DNA

<213> Mycobacterium tuberculosis

<400> 72

```

atgcggcgcg gtgaattgtg gtttgccgcc acacctgggtg gtgacagacc agtacttgtc 60
cttaccagag atccggtggc agaccgcacg ggcgcgggtcg ttgtggtggc cctaaccgcg 120
acccgccgag gcctggtgtc ggaattggag ctacagggcg tcgaaaaccg tgttccgagc 180
gactgcgtcg tcaacttcga caacattcat acgttgccac gcaccgcatt ccgacgccgc 240
atcacccggc tgtccccggc ccgcctgcac gaagcctgtc aaacactccg ggcgagcacg 300
gggtgttga 309

```

<210> 73

<211> 330

<212> DNA

<213> Mycobacterium tuberculosis

<400> 73

```

gtgaccgcac ttccggcgcg cggagagggtg tgggtggtgtg agatggctga gatcggtcgg 60
cgaccagtgc tcgtgctgtc gcgcgatgcc gcgatccctc ggctgcgacg cgcacttgtc 120
gcgccctgca ccacgacctc ccgagggcta gccagtgagg ttgttcttga acccggttcc 180
gacccgatcc cgcgccgttc gcgggtgaat ttggactcag tcgaaagtgt ctcggtcgcg 240
gtattggtga atcggttgg ccgcctcgcc gacatccgga tgcgcgccat ctgcacggcc 300
ctcgaggtcg ccgtcgattg ctctcgatga 330

```

<210> 74

<211> 118

<212> PRT

<213> Mycobacterium tuberculosis

<400> 74

```

Met Met Arg Arg Gly Ile Trp Gln Val Asp Leu Asp Pro Ala Arg
 1           5           10           15
Gly Ser Glu Ala Asn Asn Gln Arg Pro Ala Val Val Val Ser Asn Asp
 20           25           30
Arg Ala Asn Ala Thr Ala Thr Arg Leu Gly Arg Gly Val Ile Thr Val
 35           40           45
Val Pro Val Thr Ser Asn Ile Ala Lys Val Tyr Pro Phe Gln Val Leu
 50           55           60
Leu Ser Ala Thr Thr Thr Gly Leu Gln Val Asp Cys Lys Ala Gln Ala
65           70           75           80

```

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Glu Gln Ile Arg Ser Ile Ala Thr Glu Arg Leu Leu Arg Pro Ile Gly
 85 90 95
 Arg Val Ser Ala Ala Glu Leu Ala Gln Leu Asp Glu Ala Leu Lys Leu
 100 105 110
 His Leu Asp Leu Trp Ser
 115

<210> 75
 <211> 93
 <212> PRT
 <213> Mycobacterium tuberculosis

<400> 75
 Met Leu Arg Gly Glu Ile Trp Gln Val Asp Leu Asp Pro Ala Arg Gly
 1 5 10 15
 Ser Ala Ala Asn Met Arg Arg Pro Ala Val Ile Val Ser Asn Asp Arg
 20 25 30
 Ala Asn Ala Ala Ala Ile Arg Leu Asp Arg Gly Val Val Pro Val Val
 35 40 45
 Pro Val Thr Ser Asn Thr Glu Lys Val Pro Ile Pro Gly Val Val Ala
 50 55 60
 Gly Ser Glu Arg Trp Pro Gly Arg Arg Phe Glu Gly Ala Gly Pro Ala
 65 70 75 80
 Gly Trp Ile Arg Arg Cys Ala Thr Ser Pro Leu Pro Ser
 85 90

<210> 76
 <211> 114
 <212> PRT
 <213> Mycobacterium tuberculosis

<400> 76
 Met Val Ile Ser Arg Ala Glu Ile Tyr Trp Ala Asp Leu Gly Pro Pro
 1 5 10 15
 Ser Gly Ser Gln Pro Ala Lys Arg Arg Pro Val Leu Val Ile Gln Ser
 20 25 30
 Asp Pro Tyr Asn Ala Ser Arg Leu Ala Thr Val Ile Ala Ala Val Ile
 35 40 45
 Thr Ser Asn Thr Ala Leu Ala Ala Met Pro Gly Asn Val Phe Leu Pro
 50 55 60
 Ala Thr Thr Thr Arg Leu Pro Arg Asp Ser Val Val Asn Val Thr Ala
 65 70 75 80
 Ile Val Thr Leu Asn Lys Thr Asp Leu Thr Asp Arg Val Gly Glu Val
 85 90 95
 Pro Ala Ser Leu Met His Glu Val Asp Arg Gly Leu Arg Arg Val Leu
 100 105 110
 Asp Leu

<210> 77
 <211> 102
 <212> PRT
 <213> Mycobacterium tuberculosis

<400> 77
 Met Arg Arg Gly Glu Leu Trp Phe Ala Ala Thr Pro Gly Gly Asp Arg
 1 5 10 15
 Pro Val Leu Val Leu Thr Arg Asp Pro Val Ala Asp Arg Ile Gly Ala
 20 25 30
 Val Val Val Val Ala Leu Thr Arg Thr Arg Arg Gly Leu Val Ser Glu
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```

      35      40      45
Leu Glu Leu Thr Ala Val Glu Asn Arg Val Pro Ser Asp Cys Val Val
      50      55      60
Asn Phe Asp Asn Ile His Thr Leu Pro Arg Thr Ala Phe Arg Arg Arg
65      70      75      80
Ile Thr Arg Leu Ser Pro Ala Arg Leu His Glu Ala Cys Gln Thr Leu
      85      90      95
Arg Ala Ser Thr Gly Cys
      100

```

<210> 78
 <211> 109
 <212> PRT
 <213> Mycobacterium tuberculosis

```

<400> 78
Met Thr Ala Leu Pro Ala Arg Gly Glu Val Trp Trp Cys Glu Met Ala
 1      5      10      15
Glu Ile Gly Arg Arg Pro Val Val Val Leu Ser Arg Asp Ala Ala Ile
      20      25      30
Pro Arg Leu Arg Arg Ala Leu Val Ala Pro Cys Thr Thr Thr Ile Arg
      35      40      45
Gly Leu Ala Ser Glu Val Val Leu Glu Pro Gly Ser Asp Pro Ile Pro
      50      55      60
Arg Arg Ser Ala Val Asn Leu Asp Ser Val Glu Ser Val Ser Val Ala
65      70      75      80
Val Leu Val Asn Arg Leu Gly Arg Leu Ala Asp Ile Arg Met Arg Ala
      85      90      95
Ile Cys Thr Ala Leu Glu Val Ala Val Asp Cys Ser Arg
      100      105

```

<210> 79
 <211> 351
 <212> DNA
 <213> Bacillus anthracis

```

<400> 79
ttgattgtaa aacgcggcga cgtgtatattt gcagaccttt cccagtttgt tggttctgag 60
caaggagggtg ttcgtccggt tcttgtcatt caaaatgaca tcggaaatcg ttttagtcca 120
acggtgattg tagcggtat tactgcacag attcaaaaag cgaaattacc cactcatgtg 180
gaaattgatg cgaaaaagta cggttttgag agagattctg ttattttact tgagcagatt 240
cgaacaatcg ataagcagcg cttaacggac aaaatcactc acttagatga agtgatgatg 300
attcgtgtag atgaagcgct acaaattagt ttaggactaa tagattttta a 351

```

<210> 80
 <211> 116
 <212> PRT
 <213> Bacillus anthracis

```

<400> 80
Met Ile Val Lys Arg Gly Asp Val Tyr Phe Ala Asp Leu Ser Pro Val
 1      5      10      15
Val Gly Ser Glu Gln Gly Gly Val Arg Pro Val Leu Val Ile Gln Asn
      20      25      30
Asp Ile Gly Asn Arg Phe Ser Pro Thr Val Ile Val Ala Ala Ile Thr
      35      40      45
Ala Gln Ile Gln Lys Ala Lys Leu Pro Thr His Val Glu Ile Asp Ala
      50      55      60
Lys Lys Tyr Gly Phe Glu Arg Asp Ser Val Ile Leu Leu Glu Gln Ile
65      70      75      80

```

601-1-131 PCT US NATL PHASE SEQUENCE LISTING REVISED SEP10.txt

Arg Thr Ile Asp Lys Gln Arg Leu Thr Asp Lys Ile Thr His Leu Asp
 85 90 95
 Glu Val Met Met Ile Arg Val Asp Glu Ala Leu Gln Ile Ser Leu Gly
 100 105 110
 Leu Ile Asp Phe
 115

<210> 81
 <211> 348
 <212> DNA
 <213> Pseudomonas putida

<400> 81
 gtgaaacggt tgaatttcgc caggggtgat attgttcgcg tcaacctgga cccaacagtc 60
 gggcggaac agcagggtc cggccgacct gcactggtac ttactccggc tgcgttcaat 120
 gcttcaggcc tggctgtaat catcccgatc actcaagggtg gggatttcgc gaggcattgcg 180
 ggtttcgctg tcacgctcag cgggtgcgggc acgcagactc aggggggtgat gctttgcaac 240
 caggtgcgca cagtcgacct tgaagcacga tttgccaagc gcatagagtc ggtgcctgaa 300
 gctgtcatcc tggatgcact ggcgcgtgtg caaacctat tcgattaa 348

<210> 82
 <211> 345
 <212> DNA
 <213> Mycobacterium celatum

<400> 82
 tgaattgctc tgacggaacg cggcgacatc tacatcgttt cgcttgaccc gacgtcggga 60
 catgagcaga gcggcacgcg cccagtattg gtcgtgtccc cgggcgcgtt taatcgcttg 120
 acgaaaacac cggtcgtgct acctataaca cgcggcgga accttgccc aacggcaggg 180
 ttcgctgtct cgctgaccga tgcgggtact cgcaccgccg gcgtaatacg ctgcgatcag 240
 cctcgctcga ttgatattccg cgcccgtaaa ggccgcaagg ttgaacgtgt gccgtctggg 300
 gttcttgacg aagcgttggc caagctcgcc acgatcttga ctgga 345

<210> 83
 <211> 366
 <212> DNA
 <213> Shigella flexneri 2a str. 301

<400> 83
 atggtaaagg cacggacgcc acatcgtggt gagatctggt attttaaccc tgatccggtt 60
 gccgggcatg aacttcaggg gccacattat tgcattgtgg taacggacaa aaaactcaac 120
 aatgttttaa aagttgctat gtgctgcccg atttcaacag gggcaaatgc agcacgttcc 180
 acaggggtga cgggtgaacgt cctcccccg gatacgcaaa ccggtaacct gcatggcggt 240
 gtactttgtc accagctaaa agccgtcgat cttattgccc gtggcgctaa atttcatacc 300
 gttgccgatg aaaaattgat tagtgaagtt atcagtaaac tgggtgaattt aatcgaccca 360
 caataa 366

<210> 84
 <211> 351
 <212> DNA
 <213> E. coli

<400> 84
 atggtaaaga aaagtgaatt tgaacgggga gacattgtgc tggttggctt tgatccagca 60
 agcggccatg aacagcaagg tgctggctga cctgcgcttg tgctctccgt tcaagccttt 120
 aatcaactgg gaatgacgct ggtggccccc attacgcagg gcggaaattt tgcccgttat 180
 gccggattta gcgttccttt acattgcgaa gaaggcgatg tgcacggcgt ggtgctggtg 240
 aatcaggtgc ggatgatgga tctacacgcc cggctggcaa agcgtatttg tctggctgcg 300
 gatgaggtgg tgaagaggc gttattacgc ttgcaggcgg tgggtgaata a 351

<210> 85

<211> 115

<212> PRT

<213> *Pseudomonas putida*

<400> 85

```

Met Lys Arg Leu Lys Phe Ala Arg Gly Asp Ile Val Arg Val Asn Leu
 1           5           10           15
Asp Pro Thr Val Gly Arg Glu Gln Gln Gly Ser Gly Arg Pro Ala Leu
          20           25           30
Val Leu Thr Pro Ala Ala Phe Asn Ala Ser Gly Leu Ala Val Ile Ile
          35           40           45
Pro Ile Thr Gln Gly Gly Asp Phe Ala Arg His Ala Gly Phe Ala Val
          50           55           60
Thr Leu Ser Gly Ala Gly Thr Gln Thr Gln Gly Val Met Leu Cys Asn
65           70           75           80
Gln Val Arg Thr Val Asp Leu Glu Ala Arg Phe Ala Lys Arg Ile Glu
          85           90           95
Ser Val Pro Glu Ala Val Ile Leu Asp Ala Leu Ala Arg Val Gln Thr
          100          105          110
Leu Phe Asp
          115

```

<210> 86

<211> 111

<212> PRT

<213> *Mycobacterium celatum*

<400> 86

```

Met Thr Glu Arg Gly Asp Ile Tyr Ile Val Ser Leu Asp Pro Thr Ser
 1           5           10           15
Gly His Glu Gln Ser Gly Thr Arg Pro Val Leu Val Val Ser Pro Gly
          20           25           30
Ala Phe Asn Arg Leu Thr Lys Thr Pro Val Val Leu Pro Ile Thr Arg
          35           40           45
Gly Gly Asn Phe Ala Arg Thr Ala Gly Phe Ala Val Ser Leu Thr Asp
          50           55           60
Ala Gly Thr Arg Thr Ala Gly Val Ile Arg Cys Asp Gln Pro Arg Ser
65           70           75           80
Ile Asp Ile Arg Ala Arg Lys Gly Arg Lys Val Glu Arg Val Pro Ser
          85           90           95
Gly Val Leu Asp Glu Ala Leu Ala Lys Leu Ala Thr Ile Leu Thr
          100          105          110

```

<210> 87

<211> 121

<212> PRT

<213> *Shigella flexneri* 2a str. 301

<400> 87

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Met Val Lys Ala Arg Thr Pro His Arg Gly Glu Ile Trp Tyr Phe Asn
 1           5           10           15
Pro Asp Pro Val Ala Gly His Glu Leu Gln Gly Pro His Tyr Cys Ile
          20           25           30
Val Val Thr Asp Lys Lys Leu Asn Asn Val Leu Lys Val Ala Met Cys
          35           40           45
Cys Pro Ile Ser Thr Gly Ala Asn Ala Ala Arg Ser Thr Gly Val Thr
          50           55           60
Val Asn Val Leu Pro Arg Asp Thr Gln Thr Gly Asn Leu His Gly Val
65           70           75           80
Val Leu Cys His Gln Leu Lys Ala Val Asp Leu Ile Ala Arg Gly Ala
          85           90           95

```

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Lys Phe His Thr Val Ala Asp Glu Lys Leu Ile Ser Glu Val Ile Ser
 100 105 110
 Lys Leu Val Asn Leu Ile Asp Pro Gln
 115 120

<210> 88
 <211> 116
 <212> PRT
 <213> E. coli

<400> 88
 Met Val Lys Lys Ser Glu Phe Glu Arg Gly Asp Ile Val Leu Val Gly
 1 5 10 15
 Phe Asp Pro Ala Ser Gly His Glu Gln Gln Gly Ala Gly Arg Pro Ala
 20 25 30
 Leu Val Leu Ser Val Gln Ala Phe Asn Gln Leu Gly Met Thr Leu Val
 35 40 45
 Ala Pro Ile Thr Gln Gly Gly Asn Phe Ala Arg Tyr Ala Gly Phe Ser
 50 55 60
 Val Pro Leu His Cys Glu Glu Gly Asp Val His Gly Val Val Leu Val
 65 70 75 80
 Asn Gln Val Arg Met Met Asp Leu His Ala Arg Leu Ala Lys Arg Ile
 85 90 95
 Gly Leu Ala Ala Asp Glu Val Val Glu Ala Leu Leu Arg Leu Gln
 100 105 110
 Ala Val Val Glu
 115

<210> 89
 <211> 17
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> synthetic oligonucleotide

<400> 89
 aatgatgaca ctggaag 17

<210> 90
 <211> 17
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> synthetic oligonucleotide

<400> 90
 gtcgttgaca ttgatgg 17

<210> 91
 <211> 17
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> synthetic oligonucleotide

601-1-131 PCT US NATL PHASE SEQUENCE LISTING REVISED SEP10.txt

<400> 91
atctcgaaca cgcagcc 17

<210> 92
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 92
tcgttttaca cccttga 17

<210> 93
<211> 24
<212> RNA
<213> Artificial Sequence

<220>
<223> synthetic RNA substrate

<400> 93
cuuuaagaag gagauauaca uaug 24

<210> 94
<211> 23
<212> RNA
<213> Artificial Sequence

<220>
<223> synthetic RNA substrate

<400> 94
uugaagaaac cuacgaaguc gug 23

<210> 95
<211> 24
<212> RNA
<213> Artificial Sequence

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 aacaaaacag guaugugucu guguguuccu uguacaacgc aaucaaaagg auauccguuc 180

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gaaguuguuu uauccgguca ggaacgugau ggcguagcgu uagcugauca gguaaaaagu 240
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